

1123-68-94

Adam Case* (adam.case@drake.edu), Drake University, Howard Hall, 2505 University Avenue, Des Moines, IA 50311. *Bounded Turing Reductions and Data Processing Inequalities for Sequences.*

A *data processing inequality* states that the quantity of shared information between two entities (e.g. signals, strings) cannot be significantly increased when one of the entities is processed by certain kinds of transformations. We prove the existence of several data processing inequalities for sequences, where the transformations are bounded Turing functionals and the quantity of shared information is measured by the lower and upper mutual dimensions between sequences. Specifically, we show that, for all sequences X, Y , and Z , if Z is computable Lipschitz reducible to X , then

$$mdim(Z : Y) \leq mdim(X : Y) \text{ and } Mdim(Z : Y) \leq Mdim(X : Y).$$

We also show how to derive other data processing inequalities by making adjustments to the computable bounds of the *use* and *yield* of a Turing functional. (Received August 25, 2016)